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EP-A-0 008 190
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Description

The invention is related to a closure for a container including an annular locking ring comprising a plastic cap having a top wall portion and a cylindrical skirt portion depending from the top wall portion and a pilfer band depending from said skirt portion and joined to the skirt portion by fracturable means, said pilfer band including a plurality of spaced apart relatively flexible projections extending inwardly of a band portion of said pilfer band; each projection comprises an edge portion which is integral with the band portion of the pilfer band and a further edge portion which is engageable with said locking ring after said projections have been positioned below said locking ring.

A closure of this known type has been described in GB—A—2 033 350. This known closure has a lower skirt portion of relatively flexible plastic material joined at the upper skirt portion of relatively rigid plastic material. The lower skirt portion has an annular series of spaced fingers directed towards the top of the cap for engaging an outwardly-directed portion on the neck of the container as to resist axial movement of the lower skirt portion in a direction removing the cap from the container.

Object of the invention is the development of a closure having an effective, self-engaging pilfer band suitable for application to bottles or other like containers without the use of specialized production equipment, to enhance the desirability of plastic closures for use in a high speed bottling operation. In this connection a significant object of the invention is the accommodation of the application of the closure to the container without interference from said projections.

As to achieve the above mentioned objects, the closure of the invention is characterized in that:

said edge portion of each said projection is disposed at an acute angle to the vertical axis of said closure.

Due to the angular disposition of each projection with respect to the band portion of the pilfer band flexing to an out-of-the-way position is accommodated. The invention facilitates the movement of the projections of the pilfer band past the container locking ring so that thereafter the projections are disposed adjacent to and below the locking ring of the neck. The resilience of the projections causes them to again resume their original inwardly directed disposition, with each projection engageable with a locking ring. Significantly, the lateral flexibility of the projections results in much less stretching of the pilfer band during application of the closure. Consequently, there is relatively less stress put upon the fracturable skirt portion of the closure during application.

The frangible construction for the pilfer band including frangible ribs and score line has been made the subject-matter of a divisional application which has been published as follows: Application No: 86111058.3, Publication No: 0224649.

Brief description of the drawings

Figure 1 is a cross-sectional elevational view of a plastic closure in accordance with the present invention applied to a bottle or like container;

Figure 2 is a perspective view looking into the plastic closure of Figure 1;

Figure 3 is a fragmentary perspective view taken along lines 3—3 of Figure 2;

Figure 4 is a view taken along lines 4—4 of Figure 1;

Figure 5 is a fragmentary view similar to Figure 4 illustrating the closure of Figure 1 during application to the container;

Figure 6 is a view similar to Figure 5 illustrating the closure of Figure 1 during removal of the closure from the container;

Figure 7 is a fragmentary perspective view further illustrating the closure of Figure 1;

Figure 8 is a perspective view illustrating removal of the closure illustrated in Figure 1 from a container.

Detailed description

While the present invention is susceptible of embodiment in different forms, there is shown in the drawings and will hereinafter be described a presently preferred embodiment and an alternate embodiment with the understanding that the present disclosure is to be considered as an exemplification of the invention and is not intended to limit the invention to the specific embodiments illustrated.

With reference now to Figure 1, therein is illustrated a molded plastic closure 10 in accordance with the preferred embodiment of the present invention. Closure 10 is shown applied to a bottle or like container 12. Closure 10 may be fabricated from any of a variety of plastic materials, such as polypropylene or polyethylene.

Closure 10 includes a cap 14 (sometimes referred to as a shell) which includes a generally circular top wall portion 16 and a generally cylindrical skirt portion 18 depending from and integral with top wall portion 16. Skirt portion 18 includes internal threads 20 which are adapted to mate with and engage external container neck threads 22 which are formed integrally with container neck 24. Container neck 24 includes a peripherally extending, continuous annular bead portion or locking ring 26 disposed beneath neck threads 22.

Plastic closure 10 includes a plastic liner 28 positioned adjacent to top wall portion 16. Cap 14 includes an annular liner-retaining lip 30 which extends inwardly of the cap and aids in retention of plastic liner 28. As shown in Figure 1, plastic liner 28 is adapted to be brought into and maintained in sealing engagement with the side of the mouth of the container defined by the top of container neck 24. However, a closure in accordance with the present invention may be provided with a sealing arrangement other than side sealing liner 28 shown. Skirt portion 18 of cap 14 includes a plurality of circumferentially spaced, vertically extending external ribs 32 which facilitate gripping

of closure 10.

In accordance with the present invention, an integral pilfer band 34 is provided adjacent to skirt portion 18, as shown in Figures 1 and 2. Pilfer band 34 preferably is formed integrally with the closure 10 during its formation, and extends continuously about the closure and defines the lower edge thereof.

Pilfer band 34 is distinguished from skirt portion 18 of cap 14 by a peripheral, fracturable weakened skirt portion. Preferably, this weakened skirt portion comprises a plurality of circumferentially spaced, integrally molded frangible bridges or ribs 37 which extend between the inside surfaces of pilfer band 34 and skirt portion 18. The fracturable skirt portion further comprises a score line 36 which extends peripherally of the closure for creating an area of reduced strength between pilfer band 34 and skirt portion 18. Score line 36 is preferably formed so that pilfer band 34 is substantially severed and detached from skirt portion 18 except for frangible ribs 37. Depending upon the desired strength of each rib 37, the cutting edge used to form score line 36 may also be used to simultaneously score or partially cut some or all of ribs 37.

Ribs 37 provide an integral connection between pilfer band 34 and skirt portion 18 which is sufficiently strong to accommodate application of closure 10 to container 12 without failure. However, during rotation for removal of the closure from the container, pilfer band 34 resists the rotation and thus shear forces are created from the torque which act to cause ribs 37 to fail and fracture. Where score line 36 is provided substantially about the entire periphery of closure 10 and all of ribs 37 fracture, pilfer band 34 is effectively detachably connected to cap 14 of the closure, and thus fracturing of the weakened skirt area indicates partial or complete removal of the closure from container 12. Additionally, the detachable connection causes pilfer band 34 to be completely severed from cap 14 and to remain on container 12 after cap 14 is removed therefrom.

As shown in Figure 2, pilfer band 34 may be provided with a vertical score 54 or other suitable area of reduced strength. The inclusion of vertical score 54 accommodates the severance of pilfer band 34 after it has been partially or completely detached from cap 14. Preferably, score 54 extends substantially through pilfer band 34. Since it is sometimes desirable to accommodate removal of pilfer band 34 from container 12 together with cap 14, a non-scored integral connector portion 56 defined by score line 36, preferably of relatively greater strength than one of ribs 37, joins pilfer band 34 and cap 14 so that pilfer band 34 is severable and removable from the container with the closure after the pilfer band separates or fractures along vertical score 54, as shown in Figure 8.

Where removal of pilfer band 34 with cap 14 is desired, an integral connector portion may also be provided by having score line 36 extend substantially about the entire closure, with the depth of the score varied. In this way, a majority of ribs 37 may be simultaneously partially cut when score 36 is made, with one or more ribs 37 being non-scored so that they exhibit relatively greater strength then the other ribs 37 and do not fracture during removal of the closure, thus connecting pilfer band 34 to cap 14 for removal therewith from the container.

While the above-described arrangement of ribs 37 and score line 36 provides the desired fracturable area distinguishing pilfer band 34 and skirt portion 18 and is presently preferred, other scoring arrangements could be provided.

As best shown in Figure 3, pilfer band 34 includes a generally vertical, circumferentially extending annular band portion 38. Pilfer band 34 further includes an annular shoulder portion 40 which is integral with and extends inwardly of annular band portion 38.

In order to provide for mechanically locking interaction between pilfer band 34 and container neck 24, pilfer band 34 includes a plurality of relatively thin, flexible, integral wings or fingers 42. Each wing 42 comprises a tongue-like projection preferably having a generally triangular configuration, the wings 42 being spaced circumferentially about the closure 10. It will be understood, however, that the exact configuration of each wing 42 is a matter of design choice in accordance with the principles disclosed herein, and could thus be other than generally triangular.

While each of the wings 42 is generally triangular, they are not actually true triangles and include a plurality of distinct edge portions. An edge portion 44 of each wing 42 is integral with annular band portion 38 of the pilfer band. An edge portion 46 of each wing is integral with annular shoulder portion 40.

Significantly, edge portion 44 is preferably disposed at an angle alpha with respect to the vertic and the rotational axis of closure 10 (see Figure 3). As will be further described, this angle is significant in that it accommodates application of closure 10 to container 12 without interference from wings 42. Additionally, angle alpha accommodates removal of closure 10 from the portion of the mold in which it is formed which forms the wings 42, relative rotation of this mold portion and the closure facilitating removal. Angle alpha is preferably in the range of approximately 20—60 degrees, with 30 degrees being shown in Figure 3. It will be appreciated, however, that angle alpha could be zero, i.e., wings 42 would be vertically oriented, for a closure in accordance with the principles herein as will be described.

Each wing 42 further includes a first camming edge portion 48 which is adapted to engage and cam against the lower surface of locking ring 26 during removal of closure 10. Preferably, camming edge portion 48 is complemental to the lower surface of locking ring 26 which it is adapted to engage.

The mechanical locking action of each wing 42 is further provided by a second locking free edge

portion 50. Locking edge portion 50 defines the free end portion of wing 42 which is adapted to lockingly engage and interfere with the portion of container neck 24 disposed adjacent and below locking ring 26. Each wing 42 is further provided with an edge portion 52 extending between edge portion 50 and annular band portion 38. This edge portion 52 is preferably disposed at an angle from the horizontal, as shown, so that camming or flexing of the wings away from the container neck during application of the closure is facilitated.

As indicated by angle beta in Figure 4, each wing 42 of the present embodiment preferably extends angularly inwardly of band portion 38 of pilfer band 34. Angle beta is shown measured between a line defined by the intersection of the generally planar surface of each wing and a horizontal plane, and a line tangent to the closure at the intersection of the first line with annular band portion 38. Angle beta is preferably approximately 75 degrees. As further discussed, the significance of this angular disposition is twofold. First, during application of closure 10 to container 12, angle beta disposes each wing 42 so that it extends away from the direction of rotation during application, thus accommodating flexing of each wing 42 toward annular band portion 38 as the rings are moved by external threads 22 and locking ring 26. Further, this angle accommodates the dimensioning of wings 42 so that their length is sufficient to interengage and firmly abut and tend to lock against the portion of container neck 24 disposed adjacent and below locking ring 26.

It should be noted that during fabrication of the closure in accordance with the present invention, removal of the plunger portion of the mold which forms threads 20 may deform the wings from the orientation in which they are molded. Since removal may result in this undesired deformation, particularly an increasing angle beta shown in Figure 4, it may be necessary to reorient the wings, such as by manipulation by a suitable implement moved across their surfaces. Experience has shown that the resilience or memory of the wings accommodates exertion of nominal pressure on the wings in order to correctly reorient them. Additionally, variation of the closure and mold temperatures affects the severity of the deformation, and they may thus be adjusted to minimize the problem.

With particular reference to Figures 3, 4 and 5, the action of pilfer band 34 during application of closure 10 to container 12 will be described. Closure 10 is placed on container neck 24 and moved downwardly thereof. This operation is preferably performed by rotating closure 10 with respect to container 12 so that the internal threads 20 of skirt portion 18 engage and mesh with external threads 22 on container neck 24.

As the closure is moved downwardly of the container, wings 42 of pilfer band 34 are moved into engagement with the upper surface of locking ring 26. Significantly, the angular disposition of each of wings 42 from the vertical (indicated by angle alpha) results in edge portion 52 of each wing 42 engaging the surface of locking ring 26 so that each wing 42 is flexed and urged outwardly of closure 10 away from container 12. This action is clearly illustrated in Figure 5 where each of wings 42 is shown flexed outwardly of closure 10, with their surfaces each engaging the outer surface of locking ring 26 (the arrow in Figure 5 indicates the direction of rotation of closure 10 with respect to container neck 24 during application in this fashion). Notably, annular shoulder portion 40 is preferably dimensioned such that it extends inwardly of annular band portion 38 a distance at least equal to the thickness of each wing 42. In this way, additional clearance is provided between band portion 38 and locking ring 26 so that wings 42 may flex to an out-of-the-way position as closure 10 is applied to container 12.

As closure 10 is further applied to container 12 and liner 28 is brought into sealing engagement with the mouth of the container, each of wings 42 moves past locking ring 26 until each wing is disposed adjacent to and below the locking ring. After the wings have moved past the locking ring, they generally resume their original disposition due to their resilient nature or memory, and again extend at an angle from band portion 38. This condition is illustrated in Figures 1 and 4, in which camming edge portion 48 of each wing 42 is shown in engagement with the lower surface of locking ring 26.

Significantly, in this embodiment of the present invention locking edge portion 50 of each wing 42 is disposed such that it engages the portion of container neck 24 disposed adjacent to and below locking ring 26. In this arrangement, internal threads 20 and external threads 22 firmly maintain closure 10 in position on container neck 24, facilitating sealing engagement of liner 28 with the mouth of the container.

With particular reference to Figures 6 and 7, the action of wings 42 of pilfer band 34 during removal of closure 10 from container 12 will be described. The arrows in these figures indicate the direction of rotation of closure 10 with respect to container 12 during removal of the closure from the container.

As closure 10 is rotated such as by manual torsion, the action of internal hhreads 20 and external threads 22 creates an axial force within closure 10 which acts in addition to the torque applied to the closure. As this axial force increases, camming edge portion 48 of each wing 42 is urged into engagement with the surface of locking ring 26. As this occurs, each wing 42 is subjected to forces which act to urge the wing to fold or bend generally along edge portion 44 integral with annular band portion 38, as shown by the phantom arrow in Figures 3 and 7. In other words, each wing 42 attempts to increase angle beta by "bending backwards" or collapsing as closure 10 is rotated and the wings are urged into engagement with locking ring 26.

So that pilfer band 34 creates a resistance to the torque introduced by rotation of closure 10 for

removal, it is necessary that each wing 42 resists bending backwards or collapsing as camming edge portion 48 is urged and cams against locking ring 26. This result is achieved by the dimensioning of wings 42. Specifically, the length of each wing 42 is such that each extends a distance from band portion 38 greater than the distance between the band portion and contaienr neck 24. Thus, the free end portion of each wing, defined by locking edge portion 50, is urged into interfering, firmly abutting locking engagement or contact with the portion of container neck 24 disposed below and adjacent to locking ring 26.

Additionally, each wing 42, although flexible, has sufficient resiliency and thickness to effectively prevent locking edge portion 50 from collapsing and "moving past" container neck 24 as the wings are urged about edge portion 44 by camming edge portion 42 engaging locking ring 26. Thus, a resistane to the torque of rotation of closure 10 is created in pilfer band 34 as wings 42 resist the camming interaction of the wings with locking ring 26, since the lack of clearance between the band portion 38 and locking ring 26 causes the wings to effectively interfere and mechanically lock with container neck 24 so as to prevent the wings from collapsing or bending backwards.

As the resistance to the rotation of closure 10 increases, a point is reached where the resistance is greater than the torque carrying strength of the fracturable skirt portion including frangible ribs 37. When this occurs, ribs 37 between pilfer band 34 and cap 14 fracture or fail resulting in detachment of pilfer band 34 from cap 14. Thus, pilfer band 34 clearly indicates that removal of closure 10 has been attempted.

As noted above, pilfer band 34 may be provided with an area of reduced strength such as vertical score 54. Connector portion 56 thus accommodates removal of pilfer band 34 from container 12 together with cap 14 by exerting a tensile force on pilfer band 34 causing it to sever at score 54 so that it is removed from container 12 together with the remainder of closure 10. This is clearly illustrated in Figure 8 where pilfer band 34 is shown "pig-tailed" and being removed from container 12 with cap 14, the cap and the pilfer band being joined by connector portion 56 after ribs 37 and band portion 38 at score 54 have fractured.

Of fundamental importance with regard to the design of the present plastic closure is the relationship of the exact dimensions of wings 42 and the strength of the fracturable skirt portion. Specifically, it is necessary that the resistance to removal by pilfer band 34 created by wings 42 be greater than the force required to fracture the weakened portion of the closure. Otherwise, of course, pilfer band 34 would not perform its intended function since the wings would collapse or otherwise deform without the closure fracturing as intended.

Naturally, the weakened skirt portion of the closure must be sufficiently strong so that it remains intact during application of the closure to the container. Additionally, the wings preferably exhibit sufficient flexibility to accomodate movement outwardly of the closure away from the container during application to the container, yet have sufficient resilience or memory to generally resume their original disposition after moving past the locking ring or other portion of the container neck with which they are designed to interact.

Thus, if the force required for causing the ribs 37 to fail is relatively high, the number and resilience (a function of dimension and strength of material) of the wings 42 must be correspondingly increased. Conversely, if ribs 37 are provided such that a relatively small force is required for separating pilfer band 34 from the remainder of closure 10, the number of wings 42 and their individual stiffness may be decreased. Thus, the number of wings illustrated in the present embodiment (approximately 20) may be increased or decreased depending upon relative strength of the weakened skirt portion of the closure 10. In view of this, it is particularly desirable to reduce the number and thickness of wings 42 to the minimum required to provide sufficient resistance to rotation for removal of closure 10, since economy of material is of importance in economically producing plastic closures in high volume.

From the foregoing, it will be appreciated that the function of a pilfer band relates to the relatively flexible nature of the pilfer band wings which permits them to flex laterally or outwardly of the closure during application, while they still exhibit sufficient resilience in a generally vertical direction to provide the desired interaction with the container neck. To this end, the wings illustrated have been described as dimensioned to provide these characteristics, with each wing having a generally uniform thickness and being relatively thin in a circumferential direction. However, the desired results may also be achieved by providing each wing with a portion of relatively reduced thickness at or near in integral connection with the band portion of the pilfer band. In this way, each wing is provided with a "hinge" to provide the desired flexibility which would not depend on the overall thickness of the wing.

Thus, it will be appreciated that the exact configuration of the wings on a pilfer band in accordance with the present invention may be widely varied, and that the configuration may be readily adapted for use on containers having neck portions of different designs.

Claims

1. A closure for a container (12) including an annular locking ring (26) comprising a plastic cap (14) having a top wall (16) portion and a cylindrical skirt portion (18) depending from the top wall portion (16) and a pilfer band (34) depending from said skirt portion and adjoined to the skirt portion by fracturable means, said pilfer band (34)

including a plurality of spaced apart relatively flexible projections (42) extending inwardly of a band portion of said pilfer band; each projection (42) comprises an edge portion (44) which is integral with the band portion of the pilfer band and a further edge portion which is engageable with said locking ring (26) after said projections have been positioned below said locking ring, characterized in that said edge portion (44) of each said projection (42) is disposed at an acute angle (α) to the vertical axis of said closure.

2. Closure in accordance with claim 1, characterized in that each said projection (42) includes a surface disposed at said acute angle (α) with respect to the vertical axis of said closure (10).

3. Closure in accordance with any of claims 1 and 2, characterized in that said lower edge portion (52) of each said projection (42) is angled upwardly.

4. Closure in accordance with claims 1 to 3, characterized in that said fracturable means includes a plurality of frangible ribs (37) extending between said skirt portion (18) and said pilter band (34), said frangible ribs (37) detachably joining said pilfer band (34) to said skirt portion (18).

5. Closure in accordance with an of claims 1 to 3, characterized in that said fracturable means includes a plurality of circumferentially spaced, frangible ribs (37) extending between the internal surfaces of said pilfer band (34) and said skirt portion (18), said pilfer band (34) and said skirt portion (18) being distinguished from each other by a peripherally extending score line (38) extending partially into said frangible ribs (37).

6. Closure in accordance with any of claims 1 to 5, including a connector portion (56) for connecting said pilfer band (34) and said skirt portion (18) after said fracturable means fractures.

7. Closure in accordance with claim 6, characterized in that said pilfer band (34) includes an area (54) of relatively reduced strength.

8. Closure in accordance with any of claims 1 to 7, characterized in that said acute angle (α) is in the range of approximately 20 to 60 degrees.

9. Closure in accordance with any of claims 1 to 8, characterized in that said pilfer band (34) includes an annular shoulder portion (40) having a radial dimension at least equal to the thickness of said projections (42).

10. Closure in accordance with any of claims 1 to 9, characterized in that a plastic sealing liner (28) is positioned within said plastic cap (14) adjacent said top wall portion (16).

Patentansprüche

1. Verschluß für einen einen ringförmigen Sperring (26) umfassenden Behälter (12), bestehend aus einer Kunststoffklappe (14) mit einem oberen Wandteil (16) und einem von dem oberen Wandteil (16) sich abwärts erstreckenden zylindrischen Manteteil (18) sowie einem sich von dem Mantelteil abwärts erstreckenden Pilferband (34), das an den Mantelteil durch zerbrechliche Mittel angefügt ist, wobei das Pilferband (34) eine Mehrzahl von im Abstand voneinander angeordneten, verhältnismäßig flexiblen Vorsprüngen (42) umfaßt, die sich von einem Bandteil des Pilferbandes nach innen erstrecken und jeder Vorsprung (42) einen Kantenteil (44) umfaßt, der mit dem Bandteil des Pilferbandes einheitlich ausgebildet ist und eine weiterer Kantenteil an den Sperring (26) anlegbar ist, nachdem die Vorsprünge unter dem Sperring positioniert worden sind, dadurch gekennzeichnet, daß der Kantenteil (44) jedes Vorsprungs (42) in einem spitzen Winkel (α) zur senkrechten Achse des Verschlusses angeordnet ist.

2. Verschluß nach Anspruch 1, dadurch gekennzeichnet, daß jeder Vorsprung (42) eine Oberfläche umfaßt, die in dem spitzen Winkel (α) in bezug auf die senkrechte Achse des Verschlusses (10) angeordnet ist.

3. Verschluß nach einem der Ansprüche 1 und 2, dadurch gekennzeichnet, daß der untere Kantenteil (52) jedes Vorsprungs (42) nach oben abgewinkelt ist.

4. Verschluß nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß das zerbrechliche Mittel eine Mehrzahl von zerbrechlichen Rippen (37) umfaßt, die sich zwischen dem Mantelteil (18) und dem Verband (34) erstrecken, wobei die zerbrechlichen Rippen (37) das Pilferband (34) mit dem Mantelteil (18) lösbar verbinden.

5. Verschluß nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das zerbrechliche Mittel eine Mehrzahl von in Umfangsrichtung im Abstand voneinander angeordneten zerbrechlichen Rippen (37) umfaßt, die sich zwischen den Innenflächen des Pilferbandes (34) und dem Mantelteil (180 erstrecken, wobei das Pilferband (34) und der Mantelteil (18) durch eine sich in Umfangsrichtung erstreckende Kennlinie (38) auseinandergehalten sind, die sich teilwise in die zerbrechlichen Rippen (37) erstreckt.

6. Verschluß nach einem der Ansprüche 1 bis 5, umfassend einen Verbindungsteil (56) für die Verbindung des Pilferbandes (34) und des Mantelteils (18), nachdem das zerbrechliche Mittel bricht.

7. Verschluß nach Anspruch 6, dadurch gekennzeichnet, daß das Pilferband (34) einen Bereich (54) von relativ reduzierter Festigkeit umfaßt.

8. Verschluß nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß der spitze Winkel (α) im Bereich von annähernd 20 bis 60° liegt.

9. Verschluß nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß das Pilferband (34) einen ringförmigen Schulterteil (40) umfaßt, dessen radiale Abmessung mindestens gleich der Dicke der Vorsprünge (42) ist.

10. Verschluß nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß eine aus Kunststoff bestehende, abdichtende Zwischenlage (28) innerhalb der Kunststoffkappe (14) nahe dem oberen Wandteil (16) angeordnet ist.

Revendications

1. Une fermeture pour un récipient (12) compor-

tant une partie annulaire de blocage (26) comprenant un bouchon (14) en matière plastique comportant une paroi supérieure (16) et une jupe cylindrique (18) dirigée vers le bas à partir de la paroi supérieure (16) et une bande anti-violation (34) dirigée vers le bas à partir de ladite jupe et jointe à la lupe par une partie de rupture, ladite bande anti-violation (34) comportant une pluralité de saillies relativement flexibles (42), espacées l'une de l'autre et s'étendant vers l'intérieur d'une bordure de ladite bande anti-violation; chaque saillie (42) comprend une partie marginale (44) qui est solidaire de la bordure de la bande anti-violation et une autre partie marginale qui peut entrer en contact avec ladite partie annulaire de blocage (26) après que lesdites saillies ont été positionnées en dessous de ladite partie annulaire de blocage, caractérisée en ce que ladite partie marginale (44) de chacune desdites saillies (42) est disposée selon un angle aigu (α) par rapport à l'axe vertical de ladite fermeture.

2. Fermeture selon la revendication 1, caractérisée en ce que chacune desdites saillies (42) comprend une surface disposée selon ledit angle aigu (α) par rapport à l'axe vertical de ladite fermeture (10).

3. Fermeture selon une quelconque des revendications 1 et 2, caractérisée en ce que ladite partie marginale inférieure (52) de chacune desdites saillies (42) est inclinée vers le haut.

4. Fermeture selon une quelconque des revendications 1 à 3, caractérisée en ce que ladite partie de rupture comprend une pluralité de nervures cassables (37) s'étendant entre ladite jupe (18) et ladite bande anti-violation (34), lesdites nervures cassables (37) reliant de façon séparable ladite bande anti-violation (34) avec ladite jupe (18).

5. Fermeture selon une quelconque des revendications 1 à 3, caractérisée en ce que ladite partie de rupture comprend une pluralité de nervures cassables (37) espacées circonférentiellement et s'étendant entre les surfaces intérieures de ladite bande anti-violation (34) et de ladite jupe (18), ladite bande anti-violation (34) et ladite jupe (18) étant distinguées l'une de l'autre par une ligne d'encochage (38) s'étendant périphériquement et pénétrant partiellement dans lesdites nervures cassables (37).

6. Fermeture selon une quelconque des revendications 1 à 5, comprenant une partie de liaison (56) pour relier ladite bande anti-violation (34) et ladite jupe (18) après la rupture de ladite partie de rupture.

7. Fermeture selon la revendication 6, caractérisée en ce que ladite bande anti-violation (34) comprend une zone (54) de résistance relativement réduite.

8. Fermeture selon une quelconque des revendications 1 à 7, caractérisée en ce que ledit angle aigu (α) est compris entre approximativement 20 et 60 degrés.

9. Fermeture selon une quelconque des revendications 1 à 8, caractérisée en ce que ladite bande anti-violation (34) comprend un épaulement annulaire (40) ayant une dimension radiale au moins égale à l'épaisseur desdites saillies (42).

10. Fermeture selon une quelconque des revendications 1 à 9, caractérisée en ce qu'une garniture d'étanchéité (28) en matière plastique est placée à l'intérieur dudit bouchon (14) en matière plastique dans une position adjacente à ladite paroi supérieure (16).

FIG. 1

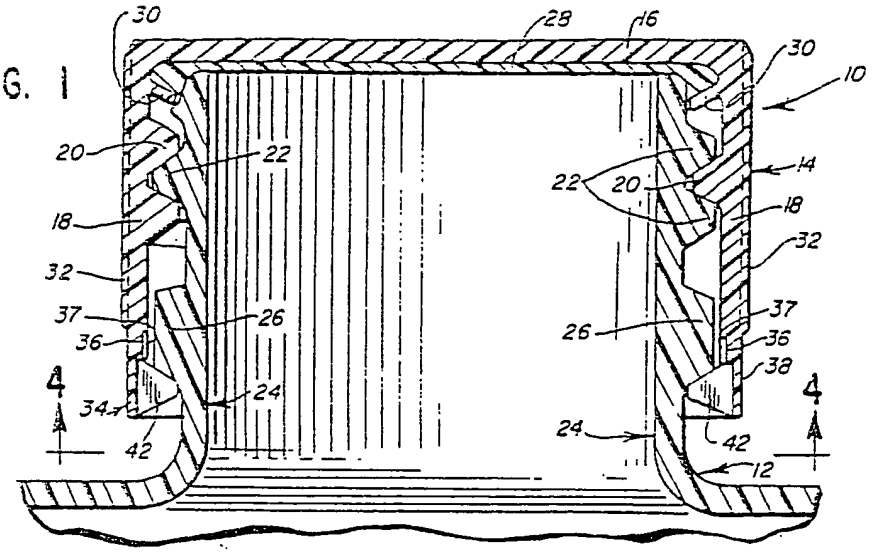


FIG. 2

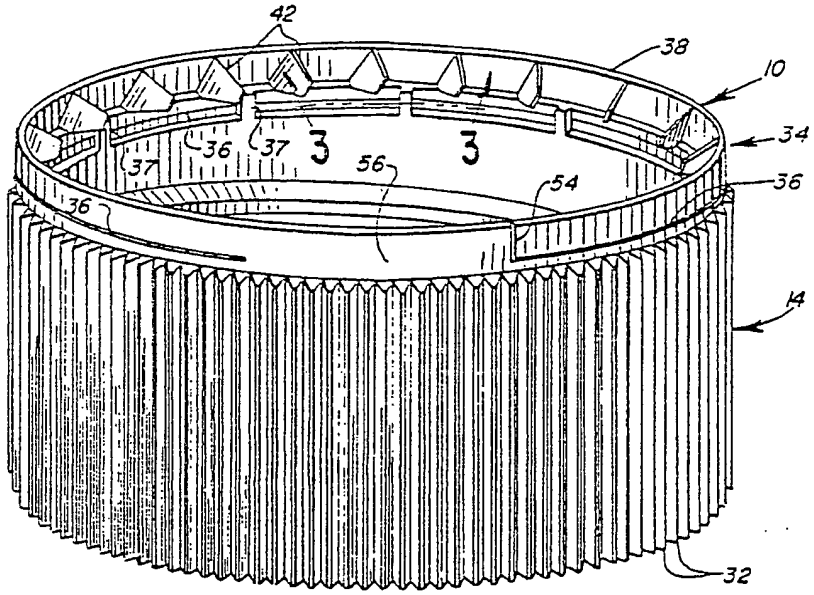


FIG. 3

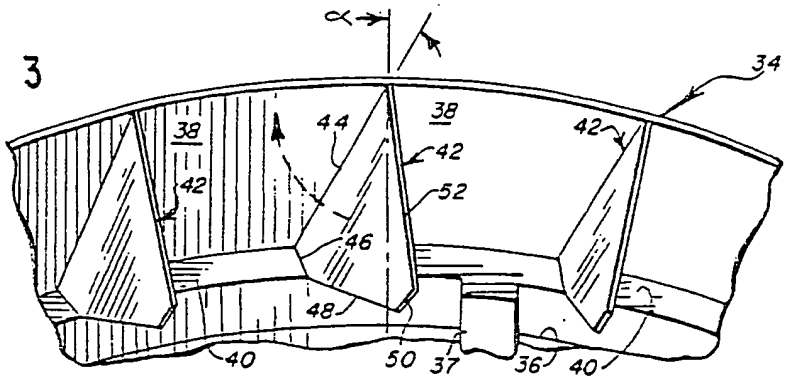


FIG. 4

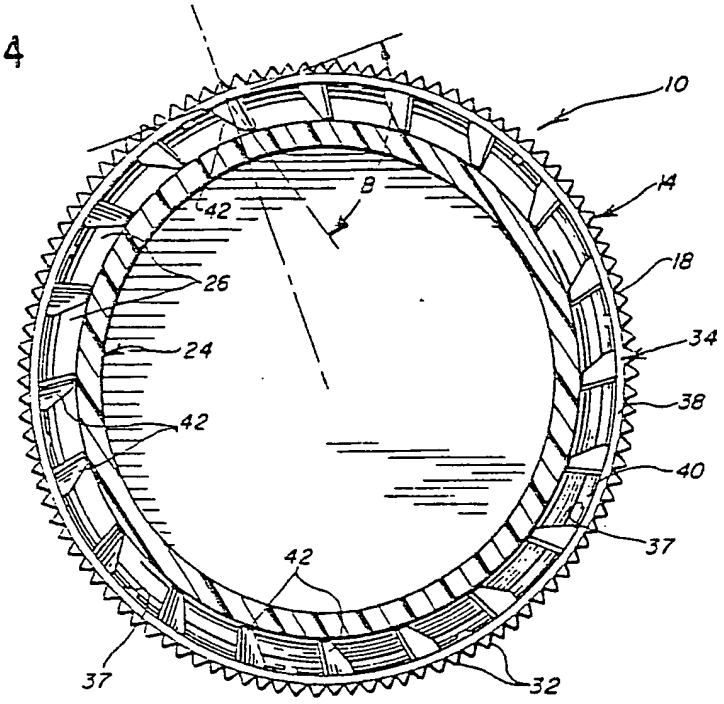
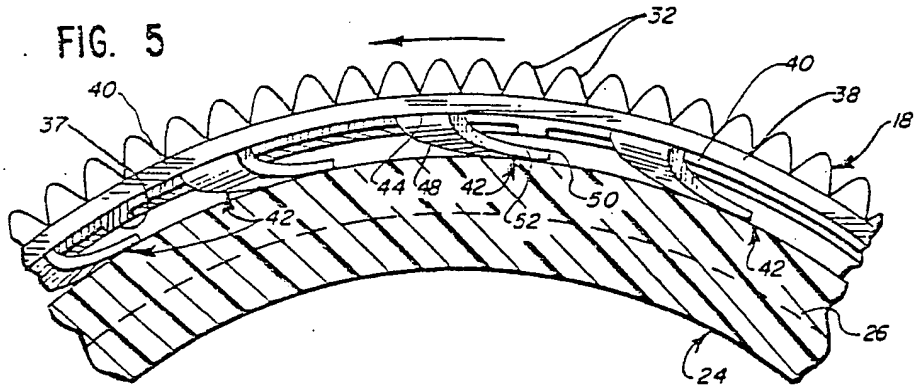


FIG. 5



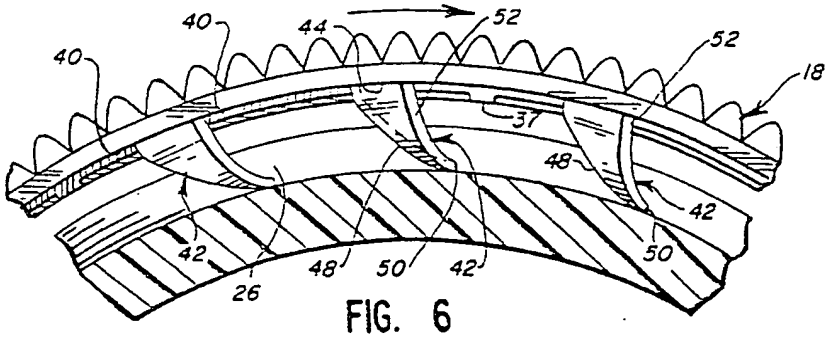


FIG. 6

FIG. 7

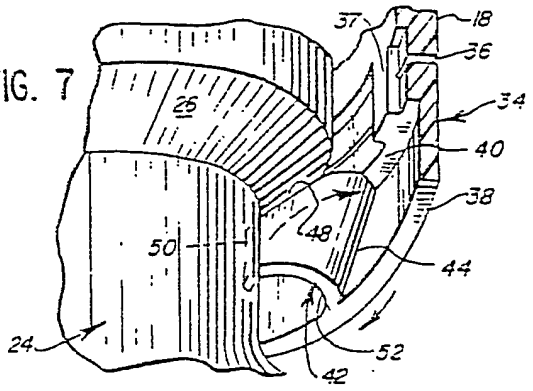


FIG. 8